

Distribution of the Belgian bristle-tails (Microcoryphia)

by Koen LOCK

Merelstraat 27, B-9000 Gent (e-mail : Koen_Lock@hotmail.com).

Abstract

Four species of Microcoryphia are present in Belgium: *Petrobius brevistylis* CARPENTER 1913 is a coastal species, *Lepismachilis y-signata* KRATOCHVIL 1945 can be found in thermophilous habitats in the Fagne-Famenne, while *Dilta hibernica* (CARPENTER 1907) and *Trigoniophthalmus alternatus* (SILVESTRI 1904) can be found in all stony habitats except the Ardennen region. Based on its occurrence in the neighboring countries, *Machilis germanica* JANETSCHKEK, 1953 can also be expected but this species could not be found in Belgium despite intensive searching. The literature about the Belgian bristle-tails is discussed, distribution maps for all the Belgian species are given and an identification key is presented.

Keywords : Machilidae, Thysanura, identification key, distribution maps.

Samenvatting

In België komen vier soorten Microcoryphia voor: *Petrobius brevistylis* CARPENTER 1913 is een kustsoort, *Lepismachilis y-signata* KRATOCHVIL 1945 kan worden gevonden in thermofiele habitats in de Fagne-Famenne terwijl *Dilta hibernica* (CARPENTER 1907) en *Trigoniophthalmus alternatus* (SILVESTRI 1904) in alle stenige habitats behalve de Ardennen voorkomen. Gebaseerd op de verspreiding in de buurlanden kan *Machilis germanica* JANETSCHKEK, 1953 ook verwacht worden maar ondanks intensief zoeken, kon deze soort in België niet worden gevonden. De literatuur over de Belgische franjestaarten werd bediscussieerd, verspreidingskaartjes voor de Belgische soorten werden gegeven en een determinatiesleutel werd voorgesteld.

Résumé

Quatre espèces de Microcoryphia sont présentes en Belgique: *Petrobius brevistylis* CARPENTER 1913 est une espèce côtière, *Lepismachilis y-signata* KRATOCHVIL 1945 se trouve dans des habitats thermophiles en Fagne-Famenne tandis que *Dilta hibernica* (CARPENTER 1907) et *Trigoniophthalmus alternatus* (SILVESTRI 1904) se trouvent dans tous les habitats pierreux sauf en Ardenne. Basé sur sa distribution dans les pays limitrophes, *Machilis germanica* JANETSCHKEK, 1953 pourrait également être présent, mais malgré des recherches intensives, l'espèce n'a pas encore été trouvée en Belgique. La littérature des espèces belges est passée en revue, des cartes de distribution pour toutes les espèces belges sont présentées ainsi qu'une clé de détermination.

Introduction

The taxon 'Thysanura' *sensu lato* has been split into Microcoryphia (=Archaeognatha) and Zygentoma (= Thysanura *sensu stricto*). Microcoryphia or bristle-tails are vegetarian, nocturnal, petrophilous and are very sensitive to desiccation. They are quite common and yet literature about the Belgian Microcoryphia is scarce. The present study gives an overview of

the literature about the Belgian Microcoryphia, an identification key and distribution maps of the species occurring in Belgium.

Material and methods

Most of the studied Microcoryphia were recently collected during field trips. In addition, the collection of the Royal Belgian Institute for Natural Sciences was studied and some insects

were kindly send by Matty BERG, Michel DETHIER, Jean-Yves BAUGNÉE and Gilles SAN MARTIN. All available material was identified according to STURM (1997) and DELANEY (1954).

Results

Literature overview

LAMEERE (1895) reported *Machilis polypoda* for Belgium, however, LAMEERE (1934) himself already indicated that different species, even belonging to different genera, were confounded under this name. LAMEERE (1909) also reported the capture of *Machilis maritima* in the harbor of Blankenberge. More recently, three specimens of *Petrobius maritimus* were reported from the eastern dam in Zeebrugge (RAPPÉ, 1989). However, both *Machilis maritima* reported by LAMEERE (1909) and *Petrobius maritimus* found by RAPPÉ (1989) probably belong to the species *Petrobius brevistylis*. In the harbor of Blankenberge, no more suitable habitat could be found, which is probably due to the renovation of the harbor. The eastern dam in Zeebrugge, however, presently contains a population of *P. brevistylis*, which strengthens the previous argument. In his overview of the Belgian Machilidae, CARPENTIER (1946) reported three species: *Dilta hibernica* (from Engis, Modave, Chaudfontaine, Vieuxville and Petit-Han), *Lepismachilis notata* (from Prayon, Modave and Petit-Han) and *Trigoniophthalmus alternatus* (from Visé, Modave, Méry and Sy). The recordings of *L. notata* reported by CARPENTIER (1946), however, probably belong to the species *Lepismachilis y-signata*. Later, TERCAFS (1960)

reported *D. hibernica* and *T. alternatus* from the entrance of caves. Recently, LOCK (2001) reported one individual of the species *Machilis germanica* from the Belgian collection of Microcoryphia in the Royal Belgian Institute for Natural Sciences but because no locality was indicated, it could not be assured if the species was really collected in Belgium. Despite intensive searching, the presence of this species in Belgium could not be confirmed.

Recorded species

Because Microcoryphia are petrophilous, they are almost absent in Flanders. Only on the eastern dam in Zeebrugge, under some boulders along the Maas in Stokkem and in a gravel slope in Cannes, some bristle-tails were found. In Wallony, however, Microcoryphia are much more common. In the present study, four species are reported for the Belgian fauna (Table 1). An identification key for the Belgian species is given in Table 2. *M. germanica* is included in this key because this species can also be expected to occur in Belgium.

Table 1. Species list of the Belgian Microcoryphia.

Microcoryphia
Machilidae
Petrobiinae
<i>Petrobius brevistylis</i> CARPENTER 1913
Machilinae
<i>Lepismachilis y-signata</i> KRATOCHVIL 1945
<i>Dilta hibernica</i> (CARPENTER 1907)
<i>Trigoniophthalmus alternatus</i> (SILVESTRI 1904)

Table 2. Identification key for the Belgian Microcoryphia.

1. Paired ocelli strongly transverse, sole-shaped (Fig. 2A-C)	2
- Paired ocelli circular or triangular (Fig. 2D&E)	4
2. Antennae only scaled on two basal segments, flagellum not scaled	<i>Petrobius brevistylis</i>
- Flagellum of antennae scaled	3
3. Paired ocelli red with a white border (only visible in living animals). Antennae clearly longer than body. Eyes without a Y-shaped drawing (Fig. 2B)	<i>Machilis germanica</i>
- Paired ocelli black to red-brown. Antennae not clearly longer than body. Eyes with a Y-shaped drawing (Fig. 2C)	<i>Lepismachilis y-signata</i>
4. Ocelli circular, situated sub-laterally before eyes (Fig. 2D)	<i>Dilta hibernica</i>
- Ocelli triangular, situated medially before eyes (Fig. 2E)	<i>Trigoniophthalmus alternatus</i>

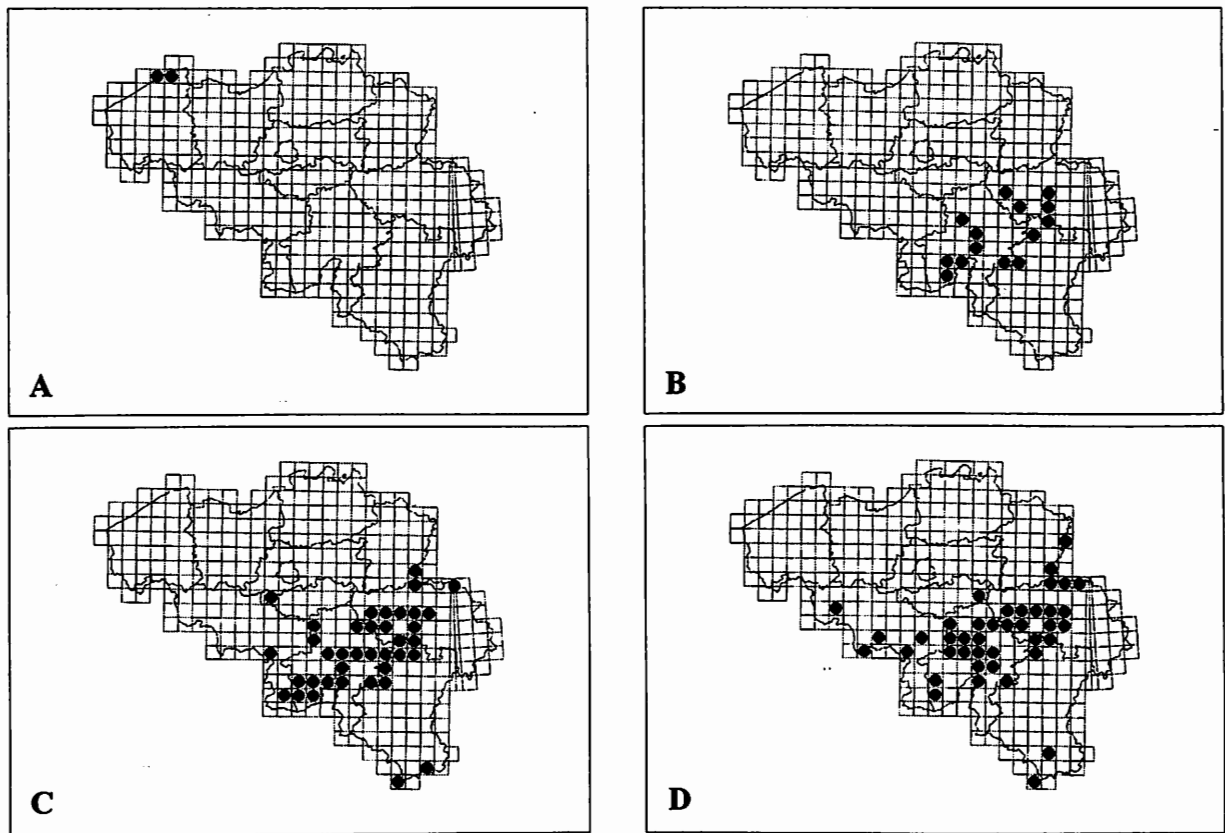


Fig. 1. Distribution maps of *Petrobius brevistylis* CARPENTER 1913 (A); *Lepismachilis y-signata* KRATOCHVIL 1945 (B); *Dilta hibernica* (CARPENTER 1907) (C) and *Trigoniophthalmus alternatus* (SILVESTRI 1904) (D).

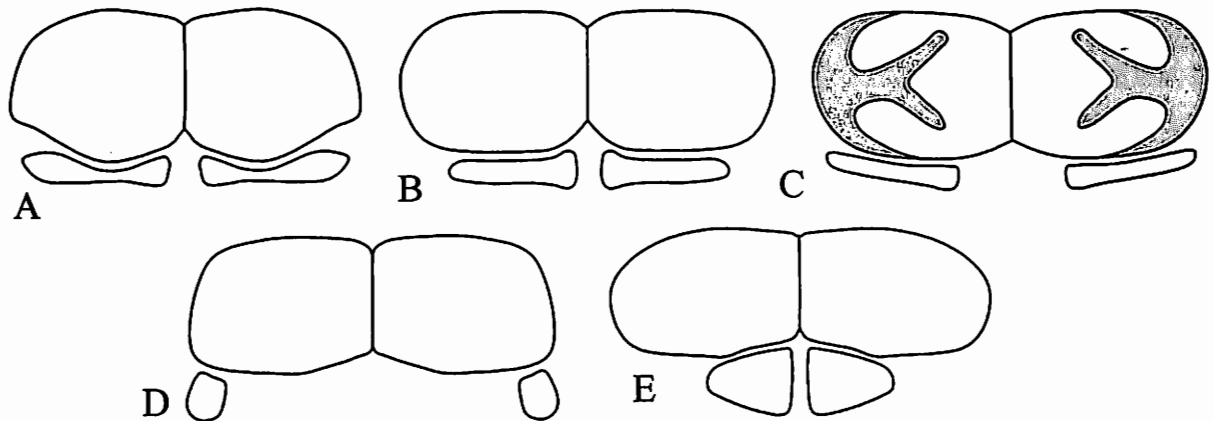


Fig. 2. Frontal view of eyes and ocelli of *Petrobius brevistylis* CARPENTER 1913 (A); *Machilis germanica* JANETSCHKE 1953 (B); *Lepismachilis y-signata* KRATOCHVIL 1945 (C); *Dilta hibernica* (CARPENTER 1907) (D) and *Trigoniophthalmus alternatus* (SILVESTRI 1904) (E).

P. brevistylis is a coastal species which has recently only been found along the eastern dam in Zeebrugge, where the species lives between rocks and decaying algae (Fig. 1A). The recent development of the nature reserve 'Baai van Heist' is probably beneficial for this species as the beach will be less disturbed and more algae will be left on the beach. As already mentioned, the species is no longer present in the harbor of

Blankenberge, where the species was reported by LAMEERE (1909). No other suitable habitats seem to be present along the Belgian coast.

L. y-signata often co-occurs with *D. hibernica* and *T. alternatus*. However, *L. y-signata* only occurs in thermophilous habitats and its distribution is restricted to south-exposed slopes in the Fagne-Famenne (Fig. 1B). *D. hibernica* and *T. alternatus* can be found in a variety of

habitats and they are present in most stony environments, however, both species seem to be absent in the Ardennen region (Fig. 1C & D).

Discussion

The bristle-tail fauna of the neighboring countries is comparable to the Belgian fauna (Table 3). Based on its presence in Luxemburg (MEISCH, 1977), the Netherlands (WYGODZINSKY, 1954) and Germany (STURM, 1997), *M.*

germanica can also be expected to occur in Belgium. *M. germanica* is even more thermophilous than *L. y-signata* and should be looked for on south-exposed slopes (MEISCH, 1977). In Germany also *Lepismachilis notata*, *L. rozszypali* and *Machilis tirolensis* have been found, but these species are not expected to occur in the Benelux. In Luxemburg, *P. brevistylis* is absent (MEISCH, 1977), which can be explained by the fact that the species is restricted to coastal habitats.

Table 3. The bristle-tails reported for Belgium and some neighboring countries. B = Belgium (present study), NL = The Netherlands (WYGODZINSKY, 1954), LUX = Luxemburg (MEISCH, 1977) and G = Germany (STURM, 1997).

Species	B	NL	LUX	G
<i>Dilta hibernica</i> (CARPENTER, 1907)	*	*	*	*
<i>Lepismachilis notata</i> STACH, 1919				*
<i>Lepismachilis rozszypali</i> KRATOCHVIL, 1945				*
<i>Lepismachilis y-signata</i> KRATOCHVIL, 1945	*	*	*	*
<i>Machilis germanica</i> JANETSCHKE, 1953		*	*	*
<i>Machilis tirolensis</i> VERHOEF, 1910				*
<i>Petrobius brevistylis</i> CARPENTER, 1913	*	*		*
<i>Trigoniophthalmus alternatus</i> (SILVESTRI, 1904)	*	*	*	*

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